

Review of Checklist and Global Rating Form Scoring Methods in Objective Structured Clinical Examination Stations: A Narrative Review

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Received: 2021 March 09

Revised: 2021 May 30

Accepted: 2021 June 12

Published online: 2021 November 01

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Citation:

Salajegheh M, Shamaeian Razavi N. Review of Checklist and Global Rating Form Scoring Methods in Objective Structured Clinical Examination Stations: A Narrative Review. *Strides Dev Med Educ.* 2021 December; 18(1):e1046. doi: 10.22062/sdme.2021.195846.1046

Abstract

Background: The objective structured clinical examination (OSCE) is broadly applied to assess the clinical competence of medical students. Despite the widespread use of the OSCE, the scoring methods used in this test can be a potential source of measurement error and affect the accuracy of the scores.

Objectives: This study was aimed to investigate the checklist and global rating form scoring methods in OSCE stations.

Methods: In this narrative review study, the keywords “OSCE”, “Reliability”, “Validity”, “Utility”, “Global”, and “Checklist” were searched in Scopus, Web of Science, EMBASE, and Medline databases between 2010 and March 2021. After removing duplicates and considering the direct relationship of the articles to the study’s objectives, full-text articles were reviewed.

Results: In total, 30 articles were retrieved, of which 19 cases were finalized. The results of retrieved articles were divided into five categories, including the correlation of scores, subjectivity and objectivity, validity and reliability, ease of use, and the need to train assessors, and the assessed capabilities in scoring by checklists and global rating forms.

Conclusion: There is widespread disagreement on the superiority of checklist over global rating form. It is recommended that both scoring methods be used in combination to achieve maximum reliability and validity, to assess student skills based on objective criteria, to avoid applying assessor mentality, and to gain maximum validity in test results.

Keywords: OSCE, Global rating form, Checklist

Background

The assessment of clinical skills in medical education has made great progress due to the widespread use of objective structured clinical examination (OSCE) (1). The OSCE is a clinical competence assessment test that can assess numerous capabilities, including taking history, clinical examinations, clinical procedures, interpretation of laboratory results, controlling patient problems, communication, and assessing inclusive attitudes. The OSCE, first designed by Harden in 1975 (2), usually consists of several stations that evoke real clinical interactions and simulations that can be used for specific cases, and immediate feedback is possible (3). In this test, the examinees pass some stations rotationally over a specified time. Students walk through all the stations and move to the next station after receiving a signal (4). At

each station, examinees must perform a specific task. In all of these stations, there are observers who use the agreed global rating form or checklist to score the examinees’ performance (5).

Due to the weaknesses in traditional tests of practical skills, the use of the OSCE in the assessment of medical students has increased remarkably (6). The advantages of the OSCE include high validity and reliability, the ability to control the complexities of the test compared to the real environment, being suitable for both summative and formative assessments, and possibility of testing a large number of examinees simultaneously under the same conditions (7). Despite the advantages of the OSCE, one of the constant concerns regards the scoring methods in the stations of this test as one of the most important factors affecting the validity of the OSCE. There are

several methods to score the OSCE, including the use of a checklist and a global rating form (8).

In scoring by a checklist, there is a yes/no answer for each item, or a score is considered according to the student's performance in the relevant station. In a global rating form, the examiner gives the student a grade in general, regardless of the checklist score (9). In recent years, there has been much debate about what scoring method to use in the OSCE. Some believe that a checklist is necessary to ensure objectivity in scoring students, whereas others argue that an overall assessment based on experts' opinions is as correct, accurate, and valid as a checklist.

In their research, Karam et al. (2018) suggested that despite the positive features of the OSCE compared to traditional assessment methods, there was a need to conduct studies on the quality and effectiveness of this test to guarantee psychometric criteria for the OSCE results(10).

Objectives

Given the increasing use of the OSCE in clinical settings, awareness of scoring methods using a checklist and a global rating form in the stations of this test can help control the sources of error and, consequently, hold valid tests; therefore, the present study was performed to investigate the scoring methods using a checklist and a global rating form in an OSCE station through literature review.

Methods

The present research is a narrative review. Review studies for the optimal use of the large amount of information produced by articles and providing a combination of evidence are of interest to researchers in various fields. In narrative review studies, scientific sources on a specific topic are described and discussed theoretically and substantively in broader scopes than systematic reviews. In this type of review, the most relevant sources are selected and reviewed (11).

In this study, the keywords "OSCE", "Reliability", "Validity", "Utility", "Checklist", and "Global" were searched in Scopus, Web of Science, EMBASE, and Medline databases to access related articles. Retrieval results were limited to the period between 2010 and March 2021. The references list of the obtained articles was also examined to search for further articles. Duplicates and articles that did not meet the inclusion criteria were excluded from the study, and considering the direct relationship of the articles to the study's aim, only full-text articles were reviewed. The inclusion criteria were determined based on keywords, time interval, relation to the study's aim, language and type of articles, and access to the full text of the article. This research was approved by the Research Ethics Committee of Kerman University of Medical Sciences (code of ethics: IR.KMU.REC.1400.075).

Results

Based on the search results, 30 articles were retrieved.

After reviewing the titles, five articles were identified as irrelevant in terms of research questions and were removed from the review process. In reviewing the abstracts of the remaining articles, six articles were deleted, and 19 articles, which were directly related to the study's Objectives, were selected. The full texts of the selected articles were studied. All the selected articles were in English. The specifications of the articles included in the study are shown in Table 1.

The results of reviewing the studies based on the characteristics of scoring methods in the OSCE station were divided into five categories, including the correlation of scores obtained from scoring using checklists and global rating forms, subjectivity, and objectivity of scoring using checklists and global rating forms, validity and reliability of scoring using checklists and global rating forms, ease of use and the need to train assessors in scoring using checklists and global rating forms, and ease of use, and the need to train assessors, and the assessed capabilities in scoring using checklists and global rating forms. These results are presented in detail below.

- The Correlation of Scores Obtained by Scoring Using Checklists and Global Rating Forms:

Numerous studies have examined the correlation between checklist scores and global rating form scores. In Sim et al.'s (2015) study conducted among 185 senior medical students using the Spearman correlation coefficient, a significant correlation between checklist scores and global scores was reported(12). In Wan et al.'s (2011) study conducted among 221 students to compare checklist scores to global scores, the passing score was determined by the Angoff method. The Spearman correlation coefficient was calculated between checklist scores and global scores of each station, and Pearson coefficient was calculated between checklist scores and global scores of all stations. Three OSCEs were assessed over two years. All students who had not gained the checklist passing score were rejected in the global rating form, as well (13). In Turner et al.'s (2014) study performed among 183 students to examine professional behaviors, the mean, standard deviation, and correlation were calculated for the checklist and global scores of each station. Then, the acceptance rate was determined for the mentioned scores. In the surveys, high means of checklist and global scores were obtained with low standard deviation. Spearman's correlation between checklist scores and global scores was satisfactorily significant. The results of this study showed that increasing students' skills and experiences in higher years of study led to increasing the correlation between checklist scores and global scores (14).

- Subjectivity and Objectivity of Scoring Using Checklists and Global Rating Forms:

Given that one of the important specifications of the OSCE is the assessment of students based on their objective performance, the OSCE scoring method, which can be performed using a checklist or a global rating form,

Table 1. The specifications of reviewed articles related to checklist and global rating form scoring methods at OSCE stations

Row	First Author	Study Year	Journal Name	Study Type	Scoring Method in OSCE ¹ Station	Reference Number
1	Joong Hiong Sim	2015	Education in Medicine Journal	Descriptive	Checklist- Global rating form	11
2	Michael Wan	2011	Medical Education	Descriptive	Checklist- Global rating form	12
3	Kaitlin Turner	2014	Education Research International	Descriptive	Checklist- Global rating form	13
4	A'man Talal Inayah	2013	BMJ Open	Descriptive	Checklist- Global rating form	14
5	Sheena CarlLee	2017	Journal of graduate medical education	Descriptive	Checklist- Global rating form	15
6	Winy Setyonugroho	2015	Patient Education and Counseling	Descriptive	Checklist	16
7	Deb Massey	2017	Nurse Education Today	Descriptive	Checklist- Global rating form	17
8	Mary A. Rawlings	2019	Journal of Baccalaureate Social Work	Descriptive	Checklist- Global rating form	18
9	Md Anwarul Azim Majumder	2019	Advances in Medical Education and Practice	Descriptive	Checklist- Global rating form	19
10	Hsiang-ping Huang	2016	Hu Li Za Zhi	Descriptive	Checklist- Global rating form	20
11	Andul Sattar Khan	2012	Creative Education	Descriptive	Checklist- Global rating form	21
12	Deborah A. Sturpe	2010	American journal of pharmaceutical education	Descriptive	Checklist- Global rating form	22
13	Vanessa N Palter	2013	Annals of surgery	Intervention	Checklist- Global rating form	23
14	Megan E.Gillis	2020	Journal of Surgical Education	Descriptive	Global rating form	24
15	Anitha Muthusami	2017	Journal of surgical education	Descriptive	Checklist	25
16	Michaelina Macluskey	2011	European Journal of Dental Education	Descriptive	Checklist- Global rating form	26
17	Montserrat Solà-Pola	2020	Nurse Education in Practice	Qualitative	Checklist- Global rating form	29
18	Irene W Y Ma	2011	Advances in health sciences education	Descriptive	Checklist- Global rating form	30
19	Giovanni Piumatt	2021	BMC Medical Education	Descriptive	Checklist- Global rating form	31

has a positive effect on the objectivity or subjectivity of the judgment of learners' performance.

The study published by Inayah et al. (2017) was performed to examine the objectivity of the scores obtained from self-assessment and evaluation of general medicine students by the observer using the global rating form in 2013. In this study, students were assessed in two OSCE stations for overall readiness and self-confidence by both methods. The scores of the first station predicted the scores in the second station. The results showed the relationship between overall readiness and self-confidence of students in the second station and those obtained in the first station using the global rating form (15).

CarlLee et al.'s (2019) study was performed on the OSCE, in which 33 internal assistants were assessed in 2017. In the stations of this test, scoring was done using a global rating form by faculty members and a standardized

checklist by patients. Assistants also performed self-assessment. The results showed that scoring using the checklist method removed the individuality or subjectivity factor, which is one of the most important criticisms expressed about other scoring methods (16), because examiners record their activities instead of interpreting the activities that examinees perform at OSCE stations, leading to eliminating the subjective scoring problem.

- Validity and Reliability of Scoring Using Checklists and Global Rating Forms:

In terms of psychometric properties including internal stability or reliability between station scores, concurrent validity, and construct validity, the global rating forms have a better status or at least as good status as checklists. The results of Setyonugroho et al.'s (2015) study revealed that the use of global rating forms significantly improved

the construct validity compared to checklists (17). Also, the results of another research on scoring using checklists and global rating forms indicated that global rating forms had higher internal reliability and stability than checklists (18).

The results of Rawlings et al.'s (2019) study also showed that the use of global rating forms created a higher construct validity compared to checklists (19). The findings of Majumder et al.'s (2019) research, in addition to confirming these results, exhibited that global rating forms had a higher construct validity and concurrent validity compared to the checklist method (20). Moreover, the results of Huang et al.'s (2017) study revealed that reliability in a global rating form and a checklist simulated by patients was equal, but the degree of validity was higher in the global rating form (21).

In Khan et al.'s (2012) study performed to assess the performance of general surgery residents using the OSCE, two surgeons were present at each station, one of whom filled the checklist and the global rating form and the other filled only the global rating form. The results showed that inter-rater reliability and construct validity in the global rating form was higher than those of the checklist. It was concluded that for the final performance-based assessment, a global rating form is more appropriate than a checklist (22).

In contrast, Sturpe et al.'s (2010) study conducted among senior medical students at the University of Toronto using an anesthesia simulator showed that inter-rater reliability was higher in checklist scores compared to that of the global scores, but assessments performed on global scores also revealed that this scoring method was useful for assessing clinical competence (23).

Regarding the simultaneous use of global rating and checklist methods, the results of the Palter et al.'s (2013) study showed that in the case of simultaneous use of global rating and checklist, a higher inter-rater reliability was reported (24).

- Ease of Use and the Need to Train Assessors in Scoring Using Checklists and Global Rating Forms:

The ease of scoring for the assessors and their experiences and skills in the OSCE are highly significant factors affecting the scoring. A review of the texts shows that global rating forms deal with the qualitative assessment of the performance of examinees at the station, such as the overall readiness of the examinee to perform the required task or the effectiveness level of their performance, but the use of these forms raises concerns about the need for further training of assessors, which has a significant effect on increasing inter-rater reliability and reducing subjective scoring (25).

If global rating forms are used in the OSCE, station designing will be easier, fewer forms will need to be completed per station, and the examiners' training time will be shorter (26). In contrast, the use of checklists adds to the complexity of the test, their ease of use for examiners is low, examiners need time to become familiar

with checklists, and the use of checklists limits examiners (27). Studies have also shown that test organizers are more inclined to use information that is aggregated or general (28).

- The Assessed Capabilities in Scoring Using Checklists and Global Rating Forms:

Most checklists used in OSCE stations have two opposites (yes and no), and this scoring method ignores some high levels of capabilities such as organizing and creating knowledge or skills related to students' attitudes, including professional ethics and empathy, and therefore, does not provide the possibility of proper and appropriate assessment of a set of medical tasks (29). In this regard, the results of Solà-Pola et al.'s study indicated that students change their behaviors based on how they are assessed (30). In another study, two independent assessors assessed the recorded performance of 34 junior residents on a simulator for formative assessment. Each assessor used three tools: a checklist consisted of 10 items, a checklist consisted of 21 items, and a global form consisted of nine items. The results showed that in 32% of cases, despite the high checklist score, students were not clinically competent. Therefore, in this regard, the global score should be considered (31). Also, the results of Piumatti et al.'s (2021) study conducted to assess students' communication skills showed that checklists were not appropriate for assessing communication skills, and global rating was helpful in this regard (32).

Discussion

The present study was performed to investigate the checklist and a global rating form scoring methods in an OSCE station. Assessment in OSCE can lead to a more objective and accurate assessment of the skills expected of the students (33). The OSCE, in addition to having many advantages such as quick feedback, the same test conditions for all examinees, the ability to assess a diverse range of skills in an environment similar to the real world, greater objectivity compared to most assessment tools, diversity of examiners, which in turn reduces bias, motivating students to learn, and high reliability and validity (in the case of proper design and implementation), has limitations too. Scoring in the OSCE depends on the performance of the student, the patient, and the examiner and has a significant effect on the individual's score (34). Also, the given scores only reflect the overall performance of the examinee and are not an indication of their individual abilities. In other words, conventional tests reflect only the performance of the candidate and are incapable of proving their competence (35).

Problems in the relationship between the examiner and the examinee do not usually affect the individuals' attitudes toward the test, and the final outcome depends on the examinee. In general, in scoring using a checklist, the details of student performance are given more value, and this method is more appropriate for inexperienced examiners. In contrast, in a global rating form, more

attention is paid to student ability, and experienced examiners prefer this method (5). Based on the evidence, there has always been disagreement about the priority of checklist or global rating. According to Sim et al.'s study, the scores obtained from checklists and global rating forms are well correlated. Although both scoring methods provide good results, the authors have suggested that, in the case of using a scoring method for the assessment stations of process skills, a checklist is preferable (11).

In Hodges et al.'s study, the global rating method had better construct validity and higher reliability compared to the checklist. The global rating method also made a very good distinction between individuals with a one-year difference in the medical course (36). In general, the results of some studies show that checklists are problematic in distinguishing between senior residents from junior residents in the OSCE. Also, when using checklists, the benefits of using experienced examiners and the strengths of their professional judgment are minimized (12). Today, the use of modern checklists in which items have different weights has led to validated assessment results and helped improve the assessment results obtained from the checklist. Judgments about the weighting of specific items should be considered when designing stations and should be consistent with the clinical assessor's expectations of the relative importance of the tasks (37). In a systematic review study by Ilgen et al., the reliability between items and between stations in the global rating method was reported to be higher than that in the checklist method, leading to a more accurate assessment of skills (37). In general, there is usually a need to train assessors in conducting the OSCE. Therefore, it is suggested that faculty development courses in designing, holding, and assessing OSCE in stations can be helpful (38, 39). Although the results of most studies reveal that the use of global rating forms in the OSCE is more appropriate, it is generally recommended that both methods be used for scoring in OSCE (40, 41).

Limitations

Given that the present study is a narrative review and does not have any predefined and systematic methods, the selection of articles and their inclusion in the study may be biased and reinforce the results of the study toward the views of the authors. However, the authors have tried to reduce the probable biases of the study as much as possible by studying multiple sources.

Conclusion

Scoring by checklists and global rating forms can both be used to determine students' clinical competence by observing the necessary requirements such as validity and reliability and using experts. There is widespread disagreement on the superiority of one over the other. It is recommended that both scoring methods be applied in combination to achieve the maximum reliability and validity.

Supplementary Material(s): is available here [To read supplementary materials, please refer to the journal website and open [PDF/HTML](#)].

Acknowledgments: This study was conducted with financial support from the Vice-Chancellor for Research and Technology of Kerman University of Medical Sciences (project number: 99001194). We are grateful for the sincere cooperation of our colleagues.

Conflict of Interests: The authors declare that they have no competing interests.

Ethical Approvals: This research was approved by the Research Ethics Committee of Kerman University of Medical Sciences (code of ethics: IR.KMU.REC.1400.075).

Funding/Support: This study was conducted with financial support from the Vice-Chancellor for Research and Technology of Kerman University of Medical Sciences (project number: 99001194).

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